Saskatchewan
Labour
Occupational Health
and Safety

Chemical and Biological Substances Guide

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Introduction

Part XXI of *The Occupational Health and Safety Regulations, 1996* places duties on the employer to protect workers from the hazards of chemical and biological substances. Part XXII deals with the employer's duty regarding substances regulated by the Workplace Hazardous Materials Information System (WHMIS). Section 85, Part VI of the regulations lists additional requirements to protect workers from biological substances that are known or suspected of causing infection in humans. The employer must address all these requirements, where they apply.

Chemicals have obvious uses and applications in chemical laboratories, in chemical production and in other chemical processes. They are also ingredients of trade name products such as paints, adhesives, photographic developers, and cleaners that are used in the workplace. Workers in food processing, sewage work, laboratories, agriculture, etc., handle biological substances or products containing biological substances of animal, plant or microbial origin.

Sometimes workers do not use, produce or handle chemical and biological substances directly, but are exposed to them when the substances are released into the workplace (for example, from processes such as welding, running equipment, oil-drilling and servicing, sawing or grinding).

Health care workers, emergency workers, animal handlers, sewage workers and others may also be exposed to **infectious** biological substances when they deal with infected persons, animals or infectious materials at work.

Hazardous substances may be released from structural materials such as insulation, new carpeting and furniture. Bacteria and fungi may grow on moist furnishings and structural materials in the workplace and even in water in ventilation systems. These microorganisms, and in some cases their spores, toxins and other products, can be released into the workplace air.

Workers may also be exposed to chemicals being stored or chemicals that have spilled, leaked or accumulated.

Chemical and biological substances may pose one or more of the following hazards:

- **Fire** – Flammable or combustible chemicals can burn under certain circumstances. Oxidizing chemicals can promote burning.

- **Explosions** – Compressed gases and liquids, reactive substances, etc. can explode under certain circumstances.

- **Toxic reactions** – Certain chemical and biological substances (e.g., bacterial toxins, mycotoxins) can be fatal or cause illness or injury if they are inhaled or enter the body by other means. The effects may occur within a short time of the exposure (acute effect) or after repeated exposures over a relatively long period, such as weeks, months or years (chronic effect). An effect may clear up within a short time, be permanent or persist for a long time (long term effect).

- **Burns** – Certain substances can cause severe eye, skin and airway irritation or damage.

- **Sensitization** – Certain chemical and biological substances (e.g., spores and bacterial enzymes) can cause skin or respiratory allergies or other sensitivity reactions.

- **Infection** – Some bacteria, viruses, fungi and parasites can be transmitted to workers and cause infectious diseases.

- **Dangerous reactions** – Reactive chemicals are unstable under certain conditions or can react with other chemicals to produce fires, explosions or toxic products.

General requirements

The general duties of the employer for controlling the risks associated with chemical and biological substances are listed in section 302 of *The Occupational Health and Safety Regulations, 1996*. The following is a guide to how employers address these duties.

- Find out what chemical and biological substances in the workplace have hazardous properties and examine their use and presence. Determine which of these substances may harm workers considering the properties of the chemicals and how workers are exposed to them.

- List all chemical and biological substances that may be hazardous to workers. This includes hazardous substances used, handled, stored, produced or disposed of during work processes and other substances workers are concerned about. Keep the list up to date. Consult with the occupational health committee, the worker health and safety representative (representative), or the workers (where there is no occupational health committee or representative) in preparing and updating the list. Identify substances on the list that are subject to WHMIS requirements.

- Assess the risk from exposure to these chemical and biological substances. Sources of information include Material Safety Data Sheets (MSDSs) and other supplier information, industry experience, including any results of monitoring done in similar situations, workers' concerns, regulatory requirements and safety organizations' information.

- If, based on the risk assessment, you suspect that the extent of exposure may cause harm to workers, consider and take all practicable (possible) steps to prevent workers from being exposed to that extent.

- Check whether any of the more hazardous substances that are in use can be eliminated or if there are less hazardous substitutes. Use suppliers' information and industry experience. As far as is reasonably practicable, substitute with the less hazardous substances.

- Examine the extent of contamination of the workplace with hazardous substances (including the work environment, work surfaces and workers' bodies). Investigate and implement reasonably practicable measures to reduce contamination.

- Develop and implement safe work procedures and processes for handling, using, transporting, storing, producing and disposing of chemical and biological substances. Integrate safety into all procedures and work processes and develop any necessary additional safe work procedures and processes.

- Inform workers of how individual chemical and biological substances can cause harm and the type and degree of harm that can result. Develop training in consultation with the occupational health committee or the representative. Training must include the risks associated with the substances, how to reduce exposure and protect workers, and what to do when there are mishaps with the substances.

WHMIS duties

Employers' duties under the Workplace Hazardous Materials Information System (WHMIS) are described in Part XXII of *The Occupational Health and Safety Regulations, 1996*. Products controlled under WHMIS (controlled products) cannot be used, but may be kept in storage at the workplace until these duties have been met (such as providing correct labels and product identifiers, Material Safety Data Sheets (MSDSs) and worker training).

Substances that meet the hazard criteria described in the federal *Controlled Products Regulations* (Canada) are "controlled products" and subject to WHMIS requirements. The Occupational Health and Safety Division publication *WHMIS Controlled Products* will assist employers and workers in recognizing controlled products. (See the Saskatchewan Labour website at www.labour.gov.sk.ca or contact the Division at 1-800-567-7233 for this, and other resources.) Products that readily burn or explode, or produce toxic reactions, allergies, infectious diseases or dangerous reactions are likely to be controlled products. Check the labels and MSDSs for hazard warnings.

The employer must develop and implement a system to obtain and update the required hazard information (MSDSs and labels) and use it to establish safe work procedures and worker training. Particular workers, positions or departments should be assigned responsibilities in the system. A competent person(s) must keep track of the flow of information and its use. A centralized ordering or receiving process will help ensure that the appropriate information is received. The occupational health committee or the representative should be consulted in setting up and auditing the system.

The system ensures that:

- An acceptable, current (less than three years old) MSDS is obtained at the time of purchase for each controlled product. The content of an acceptable MSDS is provided in sections 325 to 329 of the regulations.

- Out-of-date MSDSs must be substituted with current supplier MSDSs. When a supplier MSDS is unobtainable and the product is still in use, the employer must update the information on the MSDS.

- Relevant MSDSs are readily available to workers who need them. The availability requirement is provided in section 327 of the regulations.

- A correct WHMIS label (whether a supplier label or a workplace label) is attached to each container of a controlled product in the workplace(s). Labeling requirements are provided in sections 319 to 324 of the regulations.

- A training program is developed and delivered on the WHMIS system as well as on the hazards of controlled products, safe handling and emergency procedures where there are fugitive emissions present. The content of the training program and its objective are given in section 318 of the regulations and explained in the Division publication *WHMIS Worker Training Requirements*.

Hazardous products exempt from WHMIS

(section 304 of *The Occupational Health and Safety Regulations, 1996*)

Some hazardous products used in the workplace, such as consumer products, explosives, pesticides, drugs, cosmetics and radioactive substances, are exempt from requirements for WHMIS supplier labels and MSDSs. Hazardous waste is exempt from the MSDS requirements.

Employers are still required to collect and record the hazards of the above products and determine how to safely handle them. Containers of these products must be clearly labeled. Workers must be informed of the hazards and trained on the safe use of these products.

Employer duties for specific chemical and biological substances

Chemical and biological substances with assigned workplace contamination limits

(section 307 of *The Occupational Health and Safety Regulations, 1996)*

Workplace Contamination Limits (CLs) have been established for many workplace chemicals and some biological substances. Both 15 minute CLs and eight hour CLs are listed in Table 21 of the regulations.

The employer's duty is to ensure that workers are not exposed to average airborne concentrations of these substances that exceed the CLs. The employer must take all reasonably practicable steps to ensure that these limits are not exceeded in any area where a worker is usually present.

Airborne concentrations can be lowered by engineering controls that may include ventilation or using enclosures to prevent or minimize the release of the substance into the work environment.

In certain cases, it may not be reasonably practicable to use engineering controls. For example, the employer would not be expected to install a mechanical exhaust system to keep worker exposure below a CL if a substance is only used once a year in an annual maintenance procedure. In such cases the employer must provide alternative controls, such as appropriate personal protective equipment. (This is described in Part VII of the regulations).

The employer must address contamination of the work environment and determine the need, conditions and process for workplace monitoring. Monitoring (air sampling, personal assessment of exposure and so forth) measures contaminants in the workplace. Monitoring can help assess the risks faced and the adequacy of hazard controls.

Monitoring must be used when:

1. the work environment may not be safe because of:
   - lack of information about how badly the workplace is contaminated;
   - fluctuations in concentrations of contaminants;
   - variations in how often workers are exposed to contaminants; or,

2. workers have complained about their health, or may have become ill because of exposure(s) to workplace contaminants, and existing monitoring test results are suspect or unsatisfactory.

Monitoring is not required where there is no standard method of obtaining reliable results, or the results obtained with a standard method do not provide meaningful measures of risk.

The eight hour CL may not be appropriate to protect workers who work extended shifts (more than eight hours a day) or work weeks (more than 40 hours) because of the larger cumulative dose received over a shorter time span. In these cases, the exposure should be limited to a proportion of the eight hour CL (such as $^{8}/_{12}$ of the CL for a 12-hour shift) unless there is adequate evidence that the lower limit is not justified.

Similarly, CLs are based on exposure to one chemical. In some cases a worker may be exposed to a combination or mixture of substances, each of which has a similar toxic effect when acting on the same body organ system (additive effect). A worker exposed to such a mixture can be exposed to each substance at a concentration below its respective CL, but can still be exposed to a hazardous concentration of the mixture. In these cases, the exposure limit (concentration) for each substance must be limited to a fraction of its respective CL.

In situations of an extended shift **or** possible additive effect, the employer is required to develop and implement, in consultation with the committee, an appropriate written work procedure that limits the risk to the workers. The procedure must identify:

- substances workers may be exposed to
- conditions under which workers will be required or permitted to work, including the frequency and duration of exposure to the substances
- steps the employer will take to ensure no worker's personal exposure exceeds the equivalent of the CL

Notifiable and designated substances

(sections 305, 306, 311 of *The Occupational Health and Safety Regulations, 1996*)

A number of chemical and biological substances are listed in Table 19 of the regulations as *Notifiable Substances* because of the serious nature of the hazards associated with them. Most of these are synthetic chemicals known to **cause cancer** in humans. The employer must notify the Director of the Occupational Health and Safety Division and obtain written permission and a statement of the conditions of use before the substance is handled, used, produced, distributed or disposed of at the place of employment.

Chemicals that have been identified as **possible or probable causes of cancer** in humans have been identified in Table 20 of the regulations as *Designated Substances*. Where workers are required to handle, use, store, produce or dispose of any of these chemicals, the employer must provide engineering controls, such as local ventilation or enclosures, to prevent the chemical and biological substances from being released into the workplace. The employer must also implement other measures, such as administrative measures and use of personal protective equipment, to prevent workers from being exposed to the substance to an extent that poses any significantly greater risk of disease than persons not so exposed.

Employer duties for certain workers

(section 308 of *The Occupational Health and Safety Regulations, 1996*)

Pregnant workers and workers who are hypersensitive or unusually responsive to a substance may require additional protection. If there is a substance present in a form and to an extent that may harm these workers, and the worker notifies the employer of their condition or their response to the substance, the employer must take steps to minimize the exposure.

The worker may ask to be assigned to less hazardous, alternate work. If the worker's exposure cannot be minimized in their current position with reasonable measures, the employer must assign the worker to less hazardous, alternate work, if available.

In some cases, after taking the above steps, the employer may still not be able to completely protect the worker. In such cases, the employer is not usually expected to take further action.

Safe storage of flammable, unstable, highly reactive and corrosive substances

(section 314 of *The Occupational Health and Safety Regulations, 1996*)

Where storage of these substances may put workers at risk, the employer must ensure the substances are stored in contained and enclosed areas, isolated from work areas to the extent that minimizes the risk to workers. Storage areas must be adequately ventilated and identified as described in section 314 of the regulations.

Where two or more chemical substances, when combined, produce a toxic, corrosive or explosive reaction, the employer shall ensure that the substances are effectively separated and stored to prevent the substances from combining.

Emergency preparedness and response

(section 310 of *The Occupational Health and Safety Regulations, 1996*)

When reviewing substances in a workplace, the employer must consider possibilities for accidental spills, leaks and accumulations of substances that could be hazardous. Employers must prepare in advance for such accidents. In consultation with the committee, the employer must develop written emergency procedures. Employers must train workers on the procedures and ensure that emergency supplies and equipment are available.

If a worker could be asphyxiated or poisoned at work, the employer must make arrangements to rescue workers and treat such conditions, and make sure any antidotes, first aid and medical treatments are available. Employers must also determine the need to provide emergency eyewashes and showers.

Infectious substances

(section 85 of *The Occupational Health and Safety Regulations, 1996*)

To protect workers who are likely to be exposed to infectious materials or organisms (listed in Table 14 of the regulations), the regulations require the employer to develop and implement a written plan. The plan must be developed in consultation with the occupational health committee. The plan must:

- identify workers who may be at risk of exposure
- describe risks associated with the exposure
- describe infection control measures

- set out the procedures to be followed in cases of spills or leaks
- set out the procedures to be followed in cases of accidental exposures
- set out the procedures to be followed where a worker believes that he or she has been exposed
- set out the methods of cleaning, disinfecting or disposing of contaminated material
- describe the training that will be provided to workers
- require the investigation and documentation of exposure incidents
- require the investigation of any associated infection or disease occurrence

Where a worker has been exposed to blood or infectious body fluids, the employer is required to take follow-up actions. These actions include evaluating and assessing the extent of the exposure. For harmful exposures, follow-up actions include making arrangements for confidential post-exposure counseling, medical evaluation or medical intervention by a qualified person in a manner that is acceptable to the Department of Health. These follow-up actions are provided at the request of the worker and must be conducted during the worker's normal working hours or the worker's post-exposure follow-up time must be credited as time at work.

Accidents involving hazardous substances

Accidents involving a hazardous chemical or biological substance that:

- result in death,
- may have resulted in death, or
- result in hospitalization for more than 24 hours

must be investigated (section 29 of *The Occupational Health and Safety Regulations, 1996*). The co-chairpersons of the occupational health committee do the investigation. If there is no occupational health committee, the representative and the employer investigate. Where there is neither a committee nor a representative, the employer investigates. A written report of the accident must be prepared that includes results of the investigation and items listed in section 29(2) of the regulations.

The Occupational Health and Safety Division must be notified of accidents caused by chemical or biological substances that result, or could have resulted, in worker death or hospitalization of the worker for more than 72 hours.

If a worker is exposed to a substance listed in Table 19 or 20 of the regulations that spilled, leaked or accumulated, the employer, in consultation with the committee, must investigate the exposure and provide a written report on the investigation to the worker and the committee. Section 311 of the regulations lists the content of the investigation report.

Appendix

Workplace contamination limits

These tables were derived from Table 21 of *The Occupational Health and Safety Regulations, 1996.*

Concentrations can often be measured by instruments that determine the quantity of a substance in a known volume of air. In Table 21 of the regulations, the concentrations are expressed as the weight of a substance in milligrams per cubic metre (mg/m^3) of air. Concentrations of many gases and vapours are measured and expressed as parts (volume) of the substance in a million parts (volumes) of air (ppm). This table lists both concentration units.

Each of the two means of expressing concentrations can be converted to the other. This is often necessary when an instrument expresses a concentration in terms of ppm and this value must be compared with a contamination limit (CL) in Table 21 which lists the limits in mg/m^3 of air.

- **To convert ppm to mg/m^3, use**:

$$C\ (mg/m^3) = C\ (ppm)\ \mathbf{X}\ GMW\ (substance)/24.45$$

- **To convert mg/m^3 to ppm, use**:

$$C\ (ppm) = C\ (mg/m^3)\ \mathbf{X}\ 24.45/GMW\ (substance)$$

Where:

- **C** (mg/m^3) is the concentration expressed as the weight of the substance in a known volume of air
- **C** (ppm) is the concentration expressed as the number of parts (volume) of a substance in a million parts (volumes) of air
- **GMW** (substance) is the gram molecular weight of a substance which can be found in chemistry texts or handbooks or in a Periodic Table
- **mg/m^3** means milligrams per cubic metre
- **ppm** means parts per million
- **24.45** is the molar volume of air in litres at normal temperature and pressure conditions (25°C at normal atmospheric pressure [760 torr])

Workplace Contamination Limits

CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
75-07-0	Acetaldehyde	**C45	**C25	----	----
64-19-7	Acetic acid	25	10	37	15
108-24-7	Acetic anhydride	20	5	30	7
67-64-1	Acetone	1780	750	2380	1000
75-86-5	Acetone cyanohydrin, (as CN)	**C5	**C1.44	----	----
75-05-8	Acetonitrile	67	40	101	60
98-86-2	Acetophenone	49	10	74	15
79-27-6	Acetylene tetrabromide	14	1	21	1.5
50-78-2	Acetylsalicylic acid	5	----	10	----
107-02-8	Acrolein	0.23	0.1	0.7	0.3
79-06-1	Acrylamide	0.03	----	0.09	----
79-10-7	Acrylic acid	5.9	2	12	4
107-13-1	Acrylonitrile+*	4.3	2	8.6	4.0
124-04-9	Adipic acid	5	----	10	----
111-69-3	Adiponitrile	8.8	----	17.6	----
309-00-2	Aldrin	0.25	----	0.75	----
107-18-6	Allyl alcohol	4.8	2	9.5	4
107-05-1	Allyl chloride	3	1	6	2
106-92-3	Allyl glycidyl ether (AGE)	23	5	47	10
2179-59-1	Allyl propyl disulfide	12	2	18	3
----	Aluminum metal and oxide, (as Al)	10	----	20	----
----	Aluminum pyro powders, (as Al)	5	----	10	----
----	Aluminum welding fumes, (as Al)	5	----	10	----
----	Aluminum, soluble salts, (as Al)	2	----	4	----
----	Aluminum, alkyls, (as Al)	2	----	4	----
141-43-5	2-Aminoethanol (Ethanolamine)	7.5	3	15	6
504-29-0	2-Aminopyridine	1.9	0.5	4	1
7664-41-7	Ammonia	17	25	24	35

* *mg/m³ = milligrams of substance per cubic metre of air; ppm = parts per million*
** *C denotes ceiling limit*
+* *This entry differs slightly from the corresponding entry in the regulations. There was a typographic error in the regulations that will be corrected in a future printing*
+ *see note at end of Table*
++ *not otherwise classified*

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CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
12125-02-9	Ammonium chloride; fume	10	----	20	----
3825-26-1	Ammonium Perfluorooctanoate	0.1	----	0.3	----
7773-06-0	Ammonium sulfamate (Ammate)	10	----	20	----
628-63-7	n-Amyl acetate	532	100	665	125
626-38-0	sec-Amyl acetate	665	125	831	156
62-53-3	Aniline and homologues	7.6	2	15	4
----	Anisidine (o-, p-isomers)	0.5	0.1	1.5	0.3
7440-36-0	Antimony and compounds, (as Sb)	0.5	----	1.5	----
86-88-4	ANTU (α-Naphthyl thiourea)	0.3	----	0.9	----
7440-38-2	Arsenic, elemental, and inorganic compounds except arsine, (as As)	0.01	----	0.03	----
7784-42-1	Arsine	0.16	0.05	0.48	0.15
8052-42-4	Asphalt (petroleum) fumes	5	----	10	----
1912-24-9	Atrazine	5	----	10	----
86-50-0	Azinphos-methyl	0.2	----	0.6	----
7440-39-3	Barium, soluble compounds, (as Ba)	0.5	----	1.5	----
17804-35-2	Benomyl	10	----	20	----
106-51-4	p-Benzoquinone (Quinone)	0.4	0.1	1.2	0.3
98-88-4	Benzoyl chloride	**C2.8	**C0.5	----	----
94-36-0	Benzoyl peroxide	5	----	10	----
140-11-4	Benzyl acetate	61	10	122	20
100-44-7	Benzyl chloride	5.2	1	10.4	2
7440-41-7	Beryllium and compounds, (as Be)	0.002	----	0.01	----
92-52-4	Biphenyl (diphenyl)	1.3	0.2	4	0.6
1304-82-1	Bismuth telluride	10	----	20	
1304-82-1	Bismuth telluride, Se-doped	5	----	10	----

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	Borates, tetra, sodium salts:				
1303-43-4	Anhydrous	1	----	3	----
1304-82-1	Decahydrate	5	----	10	----
11130-12-4	Pentahydrate	1	----	3	----
1303-86-2	Boron oxide	10	----	20	----
10294-33-4	Boron tribromide	**C10	**C1	----	----
7637-07-2	Boron trifluoride	**C2.8	**C1	----	----
314-40-9	Bromacil	10	----	20	----
7726-95-6	Bromine	0.66	0.1	1.3	0.2
7789-30-2	Bromine pentafluoride	0.7	0.1	2	0.3
74-97-5	Bromochloromethane/ chlorobromomethane	1060	200	1325	250
75-25-2	Bromoform	5	0.5	10	1
106-97-8	Butane	1900	800	2375	1000
106-99-0	1,3-Butadiene	4.4	2	8.8	4
111-76-2	2-Butoxyethanol (Butyl Cellosolve)	120	25	150	30
123-86-4	n-Butyl acetate	95	20	142	25
105-46-4	sec-Butyl acetate	950	200	1190	250
540-88-5	tert-Butyl acetate	950	200	1190	250
141-32-2	Butyl acrylate	52	10	78	15
71-36-3	n-Butyl alcohol	**C152	**C50	----	----
78-92-2	sec-Butyl alcohol	303	100	378	125
75-65-0	tert-Butyl alcohol	303	100	378	125
109-73-9	n-Butylamine	**C15	**C5	----	----
1189-85-1	tert-Butyl chromate, (as CrO_3)	**C0.1	----	----	----
2426-08-6	n-Butyl glycidyl ether (BGE)	133	25	166	30
138-22-7	n-Butyl lactate	30	5	45	7.5
109-79-5	Butyl mercaptan	1.8	0.5	3.6	1
89-72-5	o-sec Butylphenol	30	5	45	7

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98-51-1	p-tert-Butyltoluene	6.1	1	12	2
7440-43-9	Cadmium, elemental and compounds, (as Cd)	0.02	----	0.06	----
1306-19-0	Cadmium oxide fume, (as Cd)	0.01	----	0.03	----
1317-65-3	Calcium carbonate	10	----	20	----
13765-19-0	Calcium chromate, (as Cr)	0.001	----	0.003	----
156-62-7	Calcium cyanamide	0.5	----	1.5	----
1305-62-0	Calcium hydroxide	5	----	10	----
1305-78-8	Calcium oxide	2	----	4	----
1344-95-2	Calcium silicate	10	----	20	----
76-22-2	Camphor, synthetic	12	2	19	3
105-60-2	Caprolactam, dust	1	----	3	----
105-60-2	Caprolactam, vapour	23	5	46	10
2425-06-1	Captafol	0.1	----	0.3	----
133-06-2	Captan	5	----	10	----
63-25-22	Carbaryl	5	----	10	----
1563-66-2	Carbofuran	0.1	----	0.3	----
1333-86-4	Carbon black	3.5	----	7	----
124-38-9	Carbon dioxide	9000	5000	54,000	30,000
75-15-0	Carbon disulfide	30	10	45	15
630-08-0	Carbon monoxide	29	25	220	190
558-13-4	Carbon tetrabromide	1.4	0.1	4.1	0.3
75-44-5	Carbonyl chloride (Phosgene)	0.4	0.1	1.2	0.3
353-50-4	Carbonyl fluoride	5.4	2	13	5
120-80-9	Catechol (Pyrocatechol)	23	5	35	7.8
9004-34-6	Cellulose (paper fibre)	10	----	20	----
21351-79-1	Cesium hydroxide	2	----	4	----
57-74-9	Chlordane	0.5	----	1.5	----
8001-35-2	Chlorinated camphene	0.5	----	1	----
55720-99-5	Chlorinated diphenyl oxide	0.5	----	1.5	----
7782-50-5	Chlorine	1.5	0.5	2.9	1

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10049-04-4	Chlorine dioxide	0.28	0.1	0.83	0.3
7790-91-2	Chlorine trifluoride	**C0.38	**C0.1	----	----
107-20-0	Chloroacetaldehyde	**C3.2	**C1	----	----
78-95-5	Chloroacetone	**C3.8	**C1	----	----
532-27-4	α-Chloroacetophenone (Phenacyl chloride)	0.3	0.05	0.9	0.15
79-04-9	Chloroacetyl chloride	0.23	0.05	0.69	0.15
108-90-7	Chlorobenzene (Monochlorobenzene)	46	10	69	15
2698-41-1	o-Chlorobenzylidene malonitrile	**C0.39	**C0.05	----	----
74-97-5	Chlorobromomethane	1060	200	1325	250
126-99-8	2-Chloro-1,3-butadiene (β-Chloroprene)	36	10	54	15
75-45-6	Chlorodifluoromethane	3540	1000	4425	1250
107-07-3	2-Chloroethanol (Ethylene chlorohydrin)	**C3.3	**C1	----	----
600-25-9	1-Chloro-1-nitropropane	10	2	20	4
76-15-3	Chloropentafluoroethane	6320	1000	7900	1250
76-06-2	Chloropicrin	0.67	0.1	2	0.3
598-78-7	2-Chloropropionic acid	0.44	0.1	1.32	0.3
2039-87-4	o-Chlorostyrene	283	50	425	75
95-49-8	o-Chlorotoluene	259	50	323	63
2921-88-2	Chlorpyrifos	0.2	----	0.6	----
7440-47-3	Chromium metal and inorganic compounds, (as Cr)	0.5	----	1.5	----
----	Metal and Cr (III) compounds, (as Cr)	0.5	----	1.5	----
----	Water soluble Cr (VI) compounds, (as Cr)++	0.05	----	0.15	
----	Insoluble Cr (VI) compounds, (as Cr)++	0.01	----	0.03	----
14977-61-8	Chromyl chloride	0.15	0.025	0.45	0.07
2971-90-6	Clopidol	10	----	20	----

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Workplace Contamination Limits

CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
----	Coal dust (respirable size)+	2	----	4	----
65996-93-2	Coal tar pitch volatiles (benzene soluble fraction) (See Particulate polycyclic aromatic hydrocarbons)	0.2	----	0.6	----
7440-48-4	Cobalt metal, dust and fume, (as Co)	0.02	----	0.06	----
10210-68-1	Cobalt carbonyl, (as Co)	0.1	----	0.3	----
16842-03-8	Cobalt hydrocarbonyl, (as Co)	0.1	----	0.3	----
7440-50-8	Copper fume, (as Cu)	0.2	----	0.6	----
	Copper dusts and mists, (as Cu)	1	----	2	----
----	Cotton dust, raw	0.2	----	0.6	----
1319-77-3	Cresol, all isomers	22	5	33	8
4170-30-3	Crotonaldehyde	5.7	2	12	4
299-86-5	Crufomate	5	----	10	----
98-82-8	Cumene	245	50	365	74
420-04-2	Cyanamide	2	----	4	----
----	Cyanides, (as CN)	5	----	10	----
460-19-5	Cyanogen	20	10	30	15
506-77-4	Cyanogen chloride	**C0.75	**C0.3	----	----
110-82-7	Cyclohexane	1030	300	1290	375
108-93-0	Cyclohexanol	206	50	257	62
108-94-1	Cyclohexanone	100	25	125	30
110-83-8	Cyclohexene	1010	300	1265	375
108-91-8	Cyclohexylamine	40	10	60	15
121-82-4	Cyclonite (RDX)	1.5	----	3	----
542-92-7	Cyclopentadiene	203	75	250	94
287-92-3	Cyclopentane	1720	600	2580	900
13121-70-5	Cyhexatin	5	----	10	----
94-75-7	2,4-D (2,4-Dichlorophenoxy-acetic acid)	10	----	20	----

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Workplace Contamination Limits

CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
50-29-3	DDT (Dichlorodiphenyltrichloro-ethane)	1	----	3	----
17702-41-9	Decaborane	0.25	0.05	0.75	0.15
8065-48-3	Demeton	0.1	0.01	0.3	0.03
123-42-2	Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	238	50	300	60
61790-53-2	Diatomaceous earth uncalcined (respirable size)+	3	----	6	----
333-41-5	Diazinon	0.1	----	0.3	----
334-88-3	Diazomethane	0.34	0.2	1	0.6
19287-45-7	Diborane	0.1	0.1	0.3	0.3
102-81-8	2-N-Dibutylaminoethanol	3.5	0.5	7	1
2528-36-1	Dibutyl phenyl phosphate	3.5	0.3	7.0	0.6
107-66-4	Dibutyl phosphate	8.6	1	17	2
84-74-2	Dibutyl phthalate	5	----	10	----
7572-29-4	Dichloracetylene	**C0.39	**C0.1	----	----
95-50-1	o-Dichlorobenzene	150	25	301	50
106-46-7	p-Dichlorobenzene	60	10	90	15
764-41-0	1,4-Dichloro-2-butene	0.025	0.005	0.075	0.015
75-71-8	Dichlorodifluoromethane	4950	1000	6200	1250
118-52-5	1,3-Dichloro-5, 5-dimethyl hydantoin	0.2	----	0.4	----
75-34-3	1,1-Dichloroethane	405	100	506	125
540-59-0	1,2-Dichloroethylene	790	200	990	250
111-44-4	Dichloroethyl ether	29	5	58	10
75-43-4	Dichloromonofluoro-methane	40	10	60	15
594-72-9	1,1-Dichloro-1-nitroethane	12	2	24	4
542-75-6	Dichloropropene	4.5	1	9	2
75-99-0	2,2-Dichloropropionic acid	5.8	1	12	2
74-14-2	Dichlorotetrafluoroethane	6990	1000	8750	1250
62-73-7	Dichlorvos	0.9	0.1	2.7	0.3

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Workplace Contamination Limits

CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
141-66-2	Dicrotophos	0.25	----	0.75	----
77-73-6	Dicyclopentadiene	27	5	41	8
102-54-5	Dicyclopentadienyl iron	10	----	20	----
60-57-1	Dieldrin	0.25	----	0.75	----
111-42-2	Diethanolamine	2	0.46	4	0.9
109-89-7	Diethylamine	15	5	45	15
100-37-8	2-Diethylaminoethanol	9.6	2	19.2	4
111-40-0	Diethylene triamine	4.2	1	8.4	2
96-22-0	Diethyl ketone	705	200	881	250
84-66-2	Diethyl phthalate	5	----	10	----
75-61-6	Difluorodibromomethane	858	100	1073	125
2238-07-5	Diglycidyl ether (DGE)	0.5	0.1	1.5	0.3
108-83-8	Diisobutyl ketone	145	25	181	30
108-18-9	Diisopropylamine	20	5	30	7
127-19-5	N,N-Dimethyl acetamide	35	10	50	15
124-40-3	Dimethylamine	9.2	5	27.6	15
121-69-7	Dimethylaniline (N,N-Dimethylaniline)	25	5	50	10
14857-34-2	Dimethylethoxysilane	2.1	0.5	6.4	1.5
68-12-2	Dimethylformamide	30	10	45	15
131-11-3	Dimethylphthalate	5	----	10	----
148-01-6	Dinitolmide	5	----	10	----
----	Dinitrobenzene (all isomers)	1	0.15	2	0.3
534-52-1	Dinitro-o-cresol	0.2	----	0.6	----
25321-14-6	Dinitrotoluene	0.15	----	0.3	----
123-91-1	1,4-Dioxane	90	25	135	40
78-34-2	Dioxathion	0.2	----	0.6	----
122-39-4	Diphenylamine	10	----	20	----
34590-94-8	Dipropylene glycol methyl ether	606	100	909	150
123-19-3	Dipropyl ketone	233	50	291	60

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231-36-7	Diquat, Total dust	0.5	----	1.5	----
	Diquat, Respirable size*	0.1		0.3	----
117-81-7	Di-sec, octyl phthalate (Di-2-ethyhexyl phthalate)	5	----	10	----
97-77-8	Disulfiram	2	----	4	----
298-04-4	Disulfoton	0.1	----	0.3	----
128-37-0	2,6-Ditert butyl-p-cresol	10	----	20	----
330-54-1	Diuron	10	----	20	----
1321-74-0	Divinyl benzene	50	10	75	15
1302-74-5	Emery	10	----	20	----
115-29-7	Endosulfan	0.1	----	0.3	----
72-20-8	Endrin	0.1	----	0.3	----
13838-16-9	Enflurane	566	75	708	100
2104-64-5	EPN	0.1	----	0.3	----
64-17-5	Ethanol	1880	1000	2350	1250
563-12-2	Ethion	0.4	----	1.2	----
110-80-5	2-Ethoxyethanol (Glycol monoethyl ether)	18	5	27	7
111-15-9	2-Ethyoxyethyl acetate (Cellosolve acetate)	27	5	41	8
141-78-6	Ethyl acetate	1440	400	1800	500
140-88-5	Ethyl acrylate	20	5	61	15
75-04-7	Ethylamine	9.2	5	27.6	15
541-85-5	Ethyl amyl ketone (5-Methyl-3-heptanone)	131	25	162	30
100-41-4	Ethyl benzene	435	100	543	125
74-96-4	Ethyl bromide	22	5	33	7
106-35-4	Ethylbutyl ketone (3-Heptanone)	230	50	288	60
75-00-3	Ethyl chloride	264	100	330	125
107-07-3	Ethylene chlorohydrin	**C3.3	**C1.0	----	----
107-15-3	Ethylenediamine	25	10	38	15

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CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
107-21-1	Ethylene glycol, (as an aerosol)	**C127	----	----	----
628-96-6	Ethylene glycol dinitrate	0.3	0.05	0.9	0.15
75-21-8	Ethylene oxide	1.8	1	3.6	2
60-29-7	Ethyl ether	1210	400	1520	500
109-94-4	Ethyl formate	300	100	450	150
16219-75-3	Ethylidene norbornene	**C25	**C5	----	----
75-08-1	Ethyl mercaptan	1.3	0.5	3.9	1.5
100-74-3	N-Ethylmorpholine	24	5	35	8
78-10-4	Ethyl silicate	85	10	128	15
22224-92-6	Fenamiphos	0.1	----	0.3	----
115-90-2	Fensulfothion	0.1	----	0.3	----
55-38-9	Fenthion	0.2	----	0.6	----
14484-64-1	Ferbam	10	----	20	----
12604-58-9	Ferrovanadium dust	1	----	3	----
----	Fluoride, (as F)	2.5	----	5	----
7782-41-4	Fluorine	1.6	1	3.1	2
944-22-9	Fonofos	0.1	----	0.3	----
50-00-0	Formaldehyde	**C0.37	**C0.3	----	----
75-12-7	Formamide	18	10	27	15
64-18-6	Formic acid	9.4	5	19	10
98-01-1	Furfural	7.9	2	16	4
98-00-0	Furfuryl alcohol	40	10	60	15
8006-61-9+*	Gasoline	890	300	1480	500
7782-65-2	Germanium tetrahydride	0.6	0.2	1.8	0.6
111-30-8	Glutaraldehyde	**C0.82	**C0.2	----	----
56-81-5	Glycerin mist	10	----	20	----
556-52-5	Glycidol	75	25	113	40
----	Grain dust (oat, wheat, barley)	4	----	----	----
7782-42-5	Graphite, natural (respirable size)+	2	----	4	----
7778-18-9	Gypsum (Calcium sulphate)	10	----	20	----

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CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
7440-58-6	Hafnium	0.5	----	1.5	----
151-67-7	Halothane	400	50	500	60
76-44-8	Heptachlor	0.05	----	0.15	----
142-82-5	Heptane (n-Heptane)	1640	400	2050	500
118-74-1	Hexachlorobenzene	0.025	----	0.075	----
77-47-4	Hexachlorocyclopentadiene	0.1	0.01	0.3	0.03
67-72-1	Hexachloroethane	9.7	1	20	2
1335-87-1	Hexachloronaphthalene	0.2	----	0.6	----
684-16-2	Hexafluoroacetone	0.68	0.1	2	0.3
822-06-0	Hexamethylene Diisocyanate	0.034	0.005	0.1	0.015
110-54-3	Hexane (n-Hexane)	176	50	220	62.5
----	Hexane (other isomers)	1760	500	3500	1000
124-09-4	Hexanediamine	2.3	0.5	4.6	1
108-84-9	sec-Hexyl acetate	295	50	369	60
107-41-5	Hexylene glycol	**C121	**C25	----	----
61788-32-7	Hydrogenated terphenyls	4.9	0.5	10	1
10035-10-6	Hydrogen bromide	**C9.9	**C3	----	----
7647-01-0	Hydrogen chloride	**C7.5	**C5	----	----
74-90-8	Hydrogen cyanide, and cyanide salts, (as CN)	**C5	**C4.7	----	----
7664-39-3	Hydrogen fluoride, (as F)	**C2.6	**C3	----	----
7722-84-1	Hydrogen peroxide	1.4	1	2.8	2
7783-07-5	Hydrogen selenide, (as Se)	0.16	0.05	0.48	0.15
7783-06-4	Hydrogen sulfide	14	10	21	15
123-31-9	Hydroquinone	2	----	4	----
999-61-1	2-Hydroxypropyl acrylate	2.8	0.5	5.6	1
95-13-6	Indene	48	10	72	15
7440-74-6	Indium and Compounds, (as In)	0.1	----	0.3	----
7553-56-2	Iodine	**C1	**C0.1	----	----
75-47-8	Iodoform	10	0.6	20	1.2

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1309-37-1	Iron oxide fume, (Fe_2O_3, as Fe)	5	----	10	----
13463-40-6	Iron pentacarbonyl, (as Fe)	0.23	0.1	0.45	0.2
----	Iron salts, soluble, (as Fe)	1	----	2	----
123-92-2	Isoamyl acetate	532	100	665	125
123-51-3	Isoamyl alcohol	360	100	452	125
110-19-0	Isobutyl acetate	713	150	891	188
78-83-1	Isobutyl alcohol	150	50	188	60
26952-21-6	Isooctyl alcohol	266	50	333	60
78-59-1	Isophorone	**C28	**C5	----	----
4098-71-9	Isophorone diisocyanate	0.045	0.005	0.135	0.015
109-59-1	Isopropoxyethanol	106	25	131	30
108-21-4	Isopropyl acetate	1040	250	1290	310
67-63-0	Isopropyl alcohol	983	400	1230	500
75-31-0	Isopropylamine	12	5	24	10
768-52-5	N-Isopropylaniline	10	2	20	4
108-20-3	Isopropyl ether	1040	250	1300	310
4016-14-2	Isopropyl glycidyl ether (IGE)	238	50	356	75
1332-58-7	Kaolin (respirable size)+	2	----	4	----
463-51-4	Ketene	0.86	0.5	2.6	1.5
7439-92-1	Lead, inorg., fumes and dusts, (as Pb)	0.15	----	0.45	----
1317-65-3	Limestone	10	----	20	----
58-89-9	Lindane	0.5	----	1.5	----
7580-67-8	Lithium hydride	0.025	----	0.075	----
68476-85-7	L.P.G. (liquified petroleum gas)	1800	1000	2250	1250
546-93-0	Magnesite	10	----	20	----
1309-48-4	Magnesium oxide fume	10	----	20	----
121-75-5	Malathion	10	----	20	----
108-31-6	Maleic anhydride	1	0.25	3	0.75

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7439-96-5	Manganese, elemental and inorganic compounds, (as Mn)	5	----	5	----
----	Manganese, fume, (as Mn)	1	----	3	----
12079-65-1	Manganese cyclopentadienyl tricarbonyl, (as Mn)	0.1	----	0.3	----
7439-97-6	Mercury, (as Hg)				
	Alkyl compounds	0.01	----	0.03	----
	Aryl compounds	0.1	----	0.3	----
	Inorganic forms, including metallic mercury	0.025	----	0.075	----
141-79-7	Mesityl oxide	60	15	100	25
79-41-4	Methacrylic acid	70	20	105	30
16752-77-5	Methomyl	2.5	----	5	----
72-43-5	Methoxychlor	10	----	20	----
109-86-4	2-Methoxyethanol (Methylcellosolve)	16	5	24	8
110-49-6	2-Methoxyethyl acetate (Methyl cellosolve acetate)	24	5	36	8
150-76-5	4-Methoxyphenol	5	----	10	----
79-20-9	Methyl acetate	606	200	757	250
74-99-7	Methyl acetylene	1640	1000	2040	1250
----	Methyl acetylene-propadiene mixture (MAPP)	1640	1000	2050	1250
96-33-3	Methyl acrylate	7	2	14	4
126-98-7	Methylacrylonitrile	2.7	1	5.4	2
109-87-5	Methylal (dimethoxy methane)	3110	1000	3875	1250
67-56-1	Methyl alcohol (methanol)	262	200	328	250
74-89-5	Methylamine	6.4	5	19	15
110-43-0	Methyl n-amyl ketone (2-Heptanone)	233	50	291	60
100-61-8	N-Methylaniline	2.2	0.5	4.4	1

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74-83-9	Methyl bromide	19	5	29	8
1634-04-4	Methyl tert-butyl ether	144+*	40	180+*	50
591-78-6	Methyl n-butyl ketone	20	5	30	7
74-87-3	Methyl chloride	103	50	207	100
137-05-3	Methyl 2-cyanoacrylate	9.1	2	18	4
108-87-2	Methylcyclohexane	1610	400	2000	500
25639-42-3	Methylcyclohexanol	234	50	293	60
583-60-8	o-Methylcyclohexanone	229	50	344	75
12108-13-3	2-Methylcyclopentadienyl manganese tricarbonyl, (as Mn)	0.2	----	0.6	----
8022-00-2	Methyl demeton	0.5	----	1.5	----
101-68-8	Methylene bisphenyl isocyanate (MDI)	0.051	0.005	0.153	0.015
5124-30-1	Methylene bis (4-cyclo-hexylisocyanate)	0.054	0.005	0.162	0.015
75-09-2	Methylene choride (dichloromethane)	174	50	218	63
101-77-9	4,4'-Methylene dianiline	0.8	0.1	2.4	0.3
78-93-3	Methyl ethyl ketone	590	200	885	300
1338-23-4	Methyl ethyl ketone peroxide	**C1.5	**C0.2	----	----
107-31-3	Methyl formate	246	100	368	150
110-12-3	Methyl isoamyl ketone	234	50	293	60
108-11-2	Methyl isobutyl carbinol	104	25	167	40
108-10-1	Methyl isobutyl ketone	205	50	307	75
624-83-9	Methyl isocyanate	0.05	0.02	0.15	0.06
563-80-4	Methyl isopropyl ketone	705	200	881	250
74-93-1	Methyl mercaptan	1	0.5	3	1.5
80-62-6	Methyl methacrylate	410	100	513	125
298-00-0	Methyl parathion	0.2	----	0.6	----
107-87-9	Methyl propyl ketone	705	200	881	250
681-84-5	Methyl silicate	6	1	12	2
98-83-9	α-Methyl styrene	242	50	483	100

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21087-64-9	Metribuzin	5	----	10	----
7786-34-7	Mevinphos	0.092	0.01	0.27	0.03
12001-26-2	Mica (respirable size)+	3	----	6	----
7439-98-7	Molybdenum, (as Mo):				
	Soluble compounds	5	----	10	----
	Insoluble compounds	10	----	20	----
6923-22-4	Monocrotophos	0.25	----	0.75	----
110-91-8	Morpholine	70	20	105	30
300-76-5	Naled	3	----	6	----
91-20-3	Naphthalene	52	10	79	15
7440-02-0	Nickel:				
	Elemental/metal	0.5	----	1.5	----
	Soluble compounds, (as Ni)	0.05	----	0.15	----
	Insoluble, (as Ni)	0.10	----	0.30	----
54-11-5	Nicotine	0.5	----	1.5	----
1929-82-4	Nitrapyrin	10	----	20	----
7697-37-2	Nitric acid	5.2	2	10.4	4
10102-43-9	Nitric oxide	31	25	47	38
100-01-6	p-Nitroaniline	3	----	6	----
98-95-3	Nitrobenzene	5	1	10	2
100-00-5	p-Nitrochlorobenzene	0.64	0.1	1.9	0.3
79-24-3	Nitroethane	307	100	383	125
10102-44-0	Nitrogen dioxide	5.6	3	9.4	5
7783-54-2	Nitrogen trifluoride	29	10	44	15
55-63-0	Nitroglycerin	0.46	0.05	1.4	0.15
75-52-5	Nitromethane	50	20	75	30
108-03-2	1-Nitropropane	90	25	135	40
----	Nitrotoluene isomers	11	2	16	3
10024-97-2	Nitrous oxide	90	50	135	75
111-84-2	Nonane	1050	200	1300	250
2234-13-1	Octachloronaphthalene	0.1	----	0.3	----

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Workplace Contamination Limits

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111-65-9	Octane	1400	300	1750	375
8012-95-1	Oil mist, mineral, severely refined	5	----	10	----
20816-12-0	Osmium tetroxide, (as Os)	0.0016	0.0002	0.0047	0.0006
144-62-7	Oxalic acid	1	----	2	----
7783-41-7	Oxygen difluoride	**C0.11	**C0.05	----	----
10028-15-6	Ozone	0.1	0.05	0.4	0.2
8002-74-2	Paraffin wax fume	2	----	4	----
4685-14-7	Paraquat, total dust	0.5	----	1.5	----
	Paraquat, (respirable sizes)+	0.1	----	0.3	----
56-38-2	Parathion	0.1	----	0.3	----
----	Particulate polycyclic aromatic hydrocarbons (PPAH), as benzene solubles	0.2	----	0.6	----
----	Particulates:				
	NOC++	10	----	20	----
	Respirable size+	3	----	6	----
19624-22-7	Pentaborane	0.013	0.005	0.039	0.015
1321-64-8	Pentachloronaphthalene	0.5	----	1.5	----
82-68-8	Pentachloronitrobenzene	0.5	----	1.5	----
87-86-5	Pentachlorophenol	0.5	----	1.5	----
115-77-5	Pentaerythritol	10	----	20	----
109-66-0	Pentane	1770	600	2210	750
594-42-3	Perchloromethyl mercaptan	0.76	0.1	2.2	0.3
7616-94-6	Perchloryl fluoride	13	3	25	6
382-21-8	Perfluoroisobutylene	**C0.082	**C0.01	----	----
93763-70-3	Perlite	10	----	20	----
108-95-2	Phenol	19	5	29	7.5
92-84-2	Phenothiazine	5	----	10	----
----	Phenylene diamine isomers	0.1	----	0.3	----
101-84-8	Phenyl ether (vapour)	7	1	14	2

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122-60-1	Phenyl glycidyl ether (PGE)	0.6	0.1	1.8	20.3
100-63-0	Phenyl hydrazine	0.44	0.1	1.32	0.3
108-98-5	Phenyl mercaptan	2.3	0.5	4.6	1
638-21-1	Phenylphosphine	**C0.23	**C0.05	----	----
298-02-2	Phorate	0.05	----	0.2	----
7803-51-2	Phosphine	0.42	0.3	1.4	1
7664-38-2	Phosphoric acid	1	----	3	----
7723-14-0	Phosphorus (yellow)	0.1	0.02	0.3	0.06
10025-87-3	Phosphorous oxychloride	0.63	0.1	1.9	0.3
10026-13-8	Phosphorous pentachloride	0.85	0.1	2.6	0.3
1314-80-3	Phosphorous pentasulfide	1	----	3	----
7719-12-2	Phosphorous trichloride	1.1	0.2	2.8	0.5
85-44-9	Phthalic anhydride	6	1	12	2
626-17-5	m-Phthalodinitrile	5	----	10	----
1918-02-1	Picloram	10	----	20	----
88-89-1	Picric acid	0.1	----	0.3	----
83-26-1	Pindone	0.1	----	0.3	----
142-64-3	Piperazine dihydrochloride	5	----	10	----
7778-18-9	Plaster of Paris	10	----	20	----
7440-06-4	Platinum metal	1	----	3	----
----	Platinum, soluble salt, (as Pt)	0.002	----	0.006	----
65997-15-1	Portland cement	10	----	20	----
1310-58-3	Potassium hydroxide	**C2	----	----	----
107-19-7	Propargyl alcohol	2.3	1	6.9	3
57-57-8	β-Propriolactone	1.5	0.5	3	1
79-09-4	Propionic acid	30	10	45	15
114-26-1	Propoxur	0.5	----	1.5	----
109-60-4	n-Propyl acetate	835	200	1040	250
71-23-8	Propyl alcohol	492	200	614	250
78-87-5	Propylene dichloride	347	75	508	110

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6423-43-4	Propylene glycol dinitrate	0.34	0.05	1.0+*	0.15
107-98-2	Propylene glycol monomethyl ether	369	100	553	150
75-56-9	Propylene oxide	48	20	72	30
627-13-4	n-Propyl nitrate	107	25	172	40
8003-34-7	Pyrethrum	5	----	10	----
110-86-1	Pyridine	16	5	32	10
108-46-3	Resorcinol	45	10	90	20
7440-16-6	Rhodium:				
	Metal and insoluble compounds, (as Rh)	1	----	3	----
	Soluble compounds, (as Rh)	0.01	----	0.03	----
299-84-3	Ronnel	10	----	20	----
83-79-4	Rotenone (commercial)	5	----	10	----
----	Rouge	10	----	20	----
8030-30-6	Rubber solvent (Naphtha)	1590	400	2000	500
7782-49-2	Selenium and compounds, (as Se)	0.2	----	0.6	----
7783-79-1	Selenium hexafluoride, (as Se)	0.16	0.05	0.45	0.15
136-78-7	Sesone	10	----	20	----
	Silica Amorphous (respirable size)+				
69012-46-2	Silica, fume	2	----	----	----
60676-86-0	Silica, fused	0.1	----	----	----
	Silica – Crystalline (respirable size)+:				
14464-46-1	Cristobalite	0.05	----	----	----
14808-60-7	Quartz	0.1	----	----	----
15468-32-3	Tridymite	0.05	----	----	----
1317-95-9	Tripoli	0.1	----	----	----
112926-00-8	Silica gel and precipitated silica	10	----	20	----
7440-21-3	Silicon	10	----	20	----

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Workplace Contamination Limits

CAS Number	Substance	8 hour average contamination limit mg/m³*	8 hour average contamination limit ppm*	15 minute average contamination limit mg/m³*	15 minute average contamination limit ppm*
409-21-2	Silicon carbide	10	----	20	----
7803-62-5	Silicon tetrahydride (Silane)	6.6	5	13	10
7440-22-4	Silver, metal	0.1	----	0.3	----
----	Silver soluble compounds, (as Ag)	0.01	----	0.03	----
----	Soapstone (total dust)	6	----	----	----
----	Soapstone (respirable size)+	3	----	6	----
26628-22-8	Sodium azide:	**C0.29	----	----	----
	as Sodium azide				
	as Hydrazoic acid vapour	**C0.2	**C0.11	----	----
7631-90-5	Sodium bisulfite	5	----	10	----
62-74-8	Sodium fluoroacetate	0.05	----	0.15	----
1310-73-2	Sodium hydroxide	**C2	----	----	----
7681-57-4	Sodium metabisulfite	5	----	10	----
9005-25-8	Starch	10	----	20	----
----	Stearates	10	----	20	----
7803-52-3	Stibine	0.5	0.1	1.5	0.3
8052-41-3	Stoddard solvent	525	100	656	125
57-24-9	Strychnine	0.15	----	0.45	----
100-42-5	Styrene, monomer	213	50	426	100
1395-21-7	Subtilisins (Proteolytic enzymes as 100% pure crystalline enzyme)	**C0.00006	----	----	----
57-50-1	Sucrose	10	----	20	----
74222-97-2	Sulfometuron methyl	5	----	10	----
3689-24-5	Sulfotep	0.2	----	0.6	----
7446-09-5	Sulfur dioxide	5.2	2	13	5
2551-62-4	Sulfur hexafluoride	5970	1000	7480	1250
7664-93-9	Sulfuric acid	1	----	3	----
10025-67-9	Sulfur monochloride	**C5.5	**C1	----	----
5714-22-7	Sulfur pentafluoride	**C0.1	**C0.01	----	----

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7783-60-0	Sulfur tetrafluoride	**C0.44	**C0.1	----	----
2699-79-8	Sulfuryl fluoride	21	5	42	10
35400-43-2	Sulprofos	1	----	3	----
14807-96-6	Talc (respirable size)+	2	----	----	----
7440-25-7	Tantalum metal and oxide, (as Ta)	5	----	10	----
13494-80-9	Tellurium and compounds, (as Te)	0.1	----	0.3	----
7783-80-4	Tellurium hexafluoride, (as Te)	0.1	0.02	0.3	0.03
3383-96-8	Temephos	10	----	20	----
107-49-3	TEPP	0.05	0.004	0.15	0.01
100-21-0	Terephthalic acid	10	----	20	----
26140-60-3	Terphenyls	**C5	**C0.53	----	----
76-11-9	1,1,1,2-Tetrachloro-2, 2-difluoroethane	4170	500	5210	625
76-12-0	1,1,2,2-Tetrachloro-1, 2-difluoroethane	4170	500	5210	625
79-34-5	1,1,2,2-Tetrachloroethane	6.9	1	14	2
127-18-4	Tetrachloroethylene (Perchloroethylene)	170	25	685	100
1335-88-2	Tetrachloronaphthalene	2	----	4	----
78-00-2	Tetraethyl lead, (as Pb)	0.1	----	0.3	----
109-99-9	Tetrahydrofuran	590	200	737	250
75-74-1	Tetramethyl lead, (as Pb)	0.15	----	0.45	----
3333-52-6	Tetramethyl succinonitrile	2.8	0.5	5.6	1
509-14-8	Tetranitromethane	0.04	0.005	0.12	0.015
7722-88-5	Tetrasodium pyrophosphate	5	----	10	----
479-45-8	Tetryl (2,4,6-trinitrophenyl-methyl nitramine)	1.5	----	3.0	----
7440-28-0	Thallium and soluble compounds, (as Tl)	0.1	----	0.3	----
96-69-5	4,4'-Thiobis (6-tert-butyl-m-cresol)	10	----	20	----
68-11-1	Thioglycolic acid	3.8	1	8	2

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7719-09-7	Thionyl chloride	**C4.9	**C1	----	----
137-26-8	Thiram	1	----	3	----
7440-31-5	Tin metal	2	----	4	----
----	Tin oxide and inorganic compounds except SnH_4, (as Sn)	2	----	4	----
----	Tin organic compounds, (as Sn)	0.1	----	0.2	----
13463-67-7	Titanium dioxide	10	----	20	----
108-88-3	Toluene (toluol)	188	50	235	60
584-84-9	Toluene-2,4-diisocyanate (TDI)	0.036	0.005	0.14	0.02
95-53-4	o-Toluidine	8.8	2	17.6	4
108-44-1	m-Toluidine	8.8	2	17.6	4
106-49-0	p-Toluidine	8.8	2	17.6	4
126-73-8	Tributyl phosphate	2.2	0.2	4.4	0.4
76-03-9	Trichloroacetic acid	6.7	1	13.4	2
120-82-1	1,2,4-Trichlorobenzene	**C37	**C5	----	----
75-55-6	1,1,1-Trichloroethane	1910	350	2460	450
79-00-5	1,1,2-Trichloroethane	55	10	83	15
79-01-6	Trichloroethylene	269	50	537	100
75-69-4	Trichlorofluoromethane	**C5620	**C1000	----	----
1321-65-9	Trichloronaphthalene	5	----	10	----
96-18-4	1,2,3-Trichloropropane	60	10	90	15
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7670	1000	9590	1250
102-71-6	Triethanolamine	5	----	10	----
121-44-8	Triethylamine	4.1	1	20.7	5
75-63-8	Trifluoromonobromo-methane	6090	1000	7300	1200
552-30-7	Trimellitic anhydride	**C0.04	----	----	----
75-50-3	Trimethylamine	12	5	36	15
25551-13-7	Trimethyl benzene	123	25	154	30
121-45-9	Trimethyl phosphite	10	2	20	4

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118-96-7	2,4,6-Trinitrotoluene (TNT)	0.5	----	1.5	----
78-30-8	Triorthocresyl phosphate	0.1	----	0.3	----
603-34-9	Triphenylamine	5	----	10	----
115-86-6	Triphenyl phosphate	3	----	6	----
7440-33-7	Tungsten, (as W)				
	Insoluble compounds	5	----	10	----
	Soluble compounds	1	----	3	----
8006-64-2	Turpentine	556	100	695	125
----	Uranium compounds, (as U)	0.1	----	----	----
----	Uranium and insoluble compounds, (as U)	0.05	----	----	----
110-62-3	n-Valeraldehyde	176	50	219	60
1314-62-1	Vanadium pentoxide, as V_2O_5, (respirable size)+ dust and fume	0.05	----	0.15	----
----	Vegetable oil mists	10	----	20	----
108-05-4	Vinyl acetate	35	10	53	15
75-35-4	Vinylidene chloride	20	5	79	20
25013-15-4	Vinyl toluene	242	50	483	100
8032-32-4	VM and P Naphtha	1370	300	1712	375
81-81-2	Warfarin	0.1	----	0.3	----
----	Welding fumes	5	----	10	----
----	Wood dust (soft wood)	5	----	10	----
----	Wood dust (certain hard woods as beech and oak)	1	----	3	----
----	Xylene (o, m-, p-isomers)	434	100	651	150
1477-55-0	m-Xylene α, α-diamine	**C0.1	----	----	----
1300-73-8	Xylidine	2.5	0.5	5	1
7440-65-5	Yttrium metal and compounds, (as Y)	1	----	3	----
7646-85-7	Zinc chloride fume	1	----	2	----
1314-13-2	Zinc oxide fume	5	----	10	----

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1314-13-2	Zinc oxide dust	10	----	20	----
7440-67-7	Zirconium and compounds, (as Zr)	5	----	10	----

+ Note: For the application of this limit, respirable size is that fraction of dust passing in a size selector with the following characteristics:

Aerodynamic Diameter (µm) (unit density sphere)	*% Passing selector*
0	100
1	97
2	91
3	74
4	50
5	30
6	17
7	9
8	5
10	1

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Occupational Health and Safety Division publications related to chemical and biological substances

To obtain any of the following publications, please visit the Saskatchewan Labour website, **www.labour.gov.sk.ca**, or call the Occupational Health and Safety Division toll free at 1-800-567-7233. A number of videos may also be borrowed free of charge in Saskatchewan. Please see the website or contact us for details.

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